भारतीय मानक
Indian Standard

IS 8144 : 2018

बहुप्रयोजी शुष्क बैटरियाँ — विशिष्टि

(दूसरा पुनरीक्षण)

Multipurpose Dry Batteries — Specification

(Second Revision)

ICS 29.220.10

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Price Group 2

Primary Cells and Batteries Sectional Committee, ETD 10

FOREWORD

This Indian Standard (Second Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Primary Cells and Batteries Sectional Committee had been approved by the Electrotechnical Division Council.

This standard was first published in 1976 and first revised in 1997. This revision is proposed towards harmonizing this standard with International Electrotechnical Commission (IEC) standard IEC 60086 edition 12 and to replace the existing IS 8144 : 1997 'Specification for Multipurpose batteries'.

The revised specifications have been updated with relevant test plans keeping the existing test environments ($27 \pm 2\ ^{o}C$). This standard also covers the requirements of Heavy Duty Batteries which were earlier covered in IS 9128 : 1999. With the publication of this standard, IS 9128 : 1999 is supreseded and hence shall be withdrawn. There will, thus, be only one standard covering all types of Zinc Carbon batteries of different sizes namely R03, R6, R14 and R20 for various applications.

This standard shall be read in conjunction with IS 6303 : 2018 'Primary Batteries — General' (*second revision*).

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

MULTIPURPOSE DRY BATTERIES — SPECIFICATION

(Second Revision)

1 SCOPE

1.1 This standard covers the requirements of dimensions and tests of zinc carbon batteries of designations R03, R6, R14 and R20 for use in all kind of applications.

2 REFERENCES

2.1 The Indian standards listed below are necessary adjuncts to this standard.

IS No.	*Title*
1885 (Part 15) : 2008	Electro technical vocabulary: Part 15 Primary and secondary cells and batteries (*second revision*)
6303 : 2018	Primary Batteries — General (*second revision*)

3 TERMINOLOGY

3.1 For the purpose of this standard, the definitions given in IS 1885 (Part 15) and IS 6303 shall apply.

4 DESIGNATION OF CELLS AND BATTERIES

4.1 The batteries shall be designated in accordance with **4.1.5** of IS 6303.

5 DIMENSIONS

5.1 Overall dimensions of batteries of R03, R6, R14 and R20 shall confirm to those as given below:

Sl. No.	Type	Diameter	Height
(1)	(2)	(3)	(4)
i)	R03	10.5 mm (Max) Tolerance 1.0 mm	44.5 mm (Max) Tolerance 2.0 mm
ii)	R6	14.5 mm (Max) Tolerance 1.0 mm	50.5 mm (Max) Tolerance 1.5 mm
iii)	R14	26.2 mm (Max) Tolerance 1.5 mm	50 mm (Max) Tolerance 1.5 mm
iv)	R20	34.2 mm (Max) Tolerance 2.0 mm	61.5 mm (Max) Tolerance 2.0 mm

NOTE — Tolerance values given above are applicable for negative side only.

6 TERMINALS

6.1 Terminals (cap and base) arrangements shall be as per **4.1.3.2** of IS 6303.

6.2 The terminals shall provide and maintain good electrical contact with the external circuit and shall so secured in the battery that they are not displaced by insertions and withdrawals in normal use.

7 REQUIREMENTS

7.1 The performance requirements of batteries R03, R6, R14 and R20 shall be as given in Tables 1, 2, 3 and 4.

NOTE — Representative applications as mentioned in Tables 1, 2, 3 and 4 are only test cases and do not restrict usage of battery.

7.2 The general requirements as applicable to this standard shall be as per IS 6303.

7.3 The nominal voltage of the batteries R03, R6, R14 and R20 shall be 1.5 V.

8 MARKING

8.1 The marking shall be done in accordance with **4.1.6** of IS 6303.

8.2 In addition to **8.1**, the battery confirming to corresponding category Standard or High Power shall be marked as S or P respectively.

NOTE — In case of R03, marking of category is not applicable.

9 TESTS

9.1 General provisions of **5.3** to **5.7** and **6.0** of IS 6303 shall apply.

9.2 Type Tests

9.2.1 Following shall constitute type tests:

a) Checking of dimensions and terminals, **(5** and **6)**
b) Checking of markings, **(8)**
c) Initial life test, **(9.4)**
d) Delayed life test, **(9.5)**
e) Leak test, **(9.6)** and
f) Delayed life test under dry heat conditions (**9.7**).

9.2.2 Samples for Type Tests

The number of samples for each battery designation

and each application required for type tests shall be as under:

Test	Number of Samples
Checking of dimensions, terminals and markings	All samples given below
Initial life test	9 pcs
Delayed life test	9 pcs

9.3 Lot Acceptance Tests

The following shall constitute the acceptance tests.

a) Initial life test of specified lot acceptance test given in Tables 1, 2, 3 and 4.

b) Sampling, inspection, testing and acceptance quality level shall be in accordance with **7.0** of IS 6303.

9.4 Initial Life Test

9.4.1 The test shall be carried out in accordance with **5.3** and **6.0** of IS 6303 and Tables 1, 2, 3 and 4.

9.4.2 The following readings shall be taken:

a) Initial closed-circuit voltage, and

b) Closed circuit voltage at the end of each discharge period.

9.4.3 The test shall be continue until the closed circuit voltage of the battery falls below the appropriate end point voltage specified in Tables 1, 2, 3 and 4. The life of the battery shall include full discharge period for the day during which the voltage drops for the first time below the specified end point for the battery.

9.4.4 Batteries shall not show leakage during or at the end of the test.

9.5 Delayed Life Test

9.5.1 Test shall be done in accordance with **5.3** and **6.0** of 6303.

9.5.2 The batteries shall be stored for period as specified in Tables 1, 2, 3 and 4.

9.5.3 After storage the batteries shall be tested in accordance with **9.4**. The batteries shall meet the requirements specified in Tables 1, 2, 3 and 4.

9.5.4 Batteries shall not show any leakage.

9.6 Leakage Test

Leak test shall be done as per **5.7** of IS 6303. No electrolyte, sealing compound or other internal component shall appear on any of the external surface of the battery.

9.7 Delayed life test under dry heat conditions

9.7.1 The batteries shall be stored in accordance with Table 4 of IS 6303.

9.7.2 After storage the batteries shall be tested for life as in **9.4**. The rated life of the batteries shall be not less than the appropriate values in Tables 1, 2, 3 and 4.

NOTE — The life of the batteries after delayed life test are under consideration.

9.7.3 The batteries shall not show leakage during storage, during discharge or at the end of the discharge.

Table 1 Performance Requirements of Battery R03

(*Clauses* 7.1, 9.4.1, 9.4.3, 9.5.2 *and* 9.5.3)

Sl. No.	Resistance (Ω)	Discharge Schedule	End Voltage	Life - Initial	Life – After 12 months	Life – Delayed Under Dry Heat Conditions	Representative Applications
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	5.1	4 min beginning at hourly Intervals for 8 hours per day	0.9	50 min	35 min	Under Consideration	Flash light
ii)	10	One hour per day	0.9	90 min	65 min	do	Digital audio
iii)	75	4 hours per day	0.9	18 h	12.7 h	do	Radio/clock
iv)	24	15 s on, 45 s off for 8 h per day	1.0	4 h	2.8 h	do	Remote control
v)	5.1	Continuous	0.9	30 min	21 min	do	Accelerated/Lot acceptance test

Table 2 Performance Requirements of Battery R6S (Standard) and R6P (High Power)

(*Clauses* 7.1, 9.4.1, 9.4.3, 9.5.2 *and* 9.5.3)

Sl. No.	Resistance (Ω)	Discharge Schedule	End Voltage (V)	Life - Initial	Life – After 12 months	Life – Delayed Under Dry Heat Conditions	Representative Applications
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
R6P (high power)							
i)	43	4 h per day	0.9	27 h	19 h	Under Consideration	Radio/Clock
ii)	3.9	1 h per day	0.8	60 min	42 min	-do-	Motor/Toy
iii)	10	1 h per day	0.9	4.0 h	2.8 h	-do-	Tape recorder
iv)	24	15 s on, 45 s off for 8 h per day	1.0	11.0 h	7.7 h	-do-	Remote control
v)	1.8	15 s on, 45 s off for 24 h per day	0.9	60 pulses	42 pulses	-do-	Pulse test
vi)	3.9	Continuous	0.9	50 min	35 min	-do-	Accelerated/Lot acceptance test
R6S (standard)							
vii)	43	4 h per day	0.9	22.0 h	15.4 h	Under Consideration	Radio/Clock
viii)	3.9	Continuous	0.9	30 min	21 min	-do-	Accelerated/Lot acceptance test

Table 3 Performance Requirements of Battery R14S (Standard) and R14P (High Power)

(*Clauses* 7.1, 9.4.1, 9.4.3, 9.5.2 *and* 9.5.3)

Sl. No.	Resistance (Ω)	Discharge Schedule	End Voltage (V)	Life - Initial	Life – After 12 months	Life – Delayed Under Dry Heat Conditions	Representative Applications
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
R14P (high power)							
i)	3.9	4 min beginning at hourly intervals for 8 h per day	0.9	270 min	190 min	Under Consideration	Portable lighting
ii)	20	4 h per day	0.9	27.0 h	19 h	-do-	Radio
iii)	3.9	1 h per day	0.8	3.0 h	2.1 h	-do-	Toy
iv)	3.9	Continuous	0.9	120 min	84 min	-do-	Accelerated/Lot acceptance test
R14S (standard)							
v)	3.9	4 min beginning at hourly intervals for 8 h per day	0.9	120 min	84 min	Under Consideration	Portable lighting
vi)	20	4 h per day	0.9	13.5 h	9.5 h	-do-	Radio
vii)	3.9	1 h per day	0.8	90 min	63 min	-do-	Toy
viii)	3.9	Continuous	0.9	60 min	42 min	-do-	Accelerated/Lot acceptance test

Table 4 Performance Requirements of Battery R20S (Standard) and R20P (High Power)

(*Clauses* 7.1, 9.4.1, 9.4.3, 9.5.2 *and* 9.5.3)

Sl. No.	Resistance (Ω)	Discharge Schedule	End Voltage (V)	Life - Initial	Life – After 12 months	Life – Delayed Under Dry Heat Conditions	Representative Applications
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
R20P (high power)							
i)	2.2	4 min beginning at hourly intervals for 8 h per day	0.9	250 min	175 min	Under Consideration	Portable lighting
ii)	10	4 hour per day	0.9	18.0 h	12.7 h	-do-	Radio
iii)	2.2	1 hour per day	0.8	3.5 h	2.5 h	-do-	Toy
iv)	3.9	Continuous	0.9	240 min	170 min	-do-	Accelerated/Lot acceptance test
R20S (standard)							
v)	2.2	4 min beginning at hourly intervals for 8 h per day	0.9	100 min	70 min	Under Consideration	Portable lighting
vi)	10	4 h per day	0.9	15.0 h	10.5 h	-do-	Radio
vii)	2.2	1 h per day	0.8	2.0 h	1.4 h	-do-	Toy
viii)	3.9	Continuous	0.9	160 min	115 min	-do-	Accelerated/Lot acceptance test

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